DEFENSE INFORMATION SYSTEMS AGENCY
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MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of the Juniper Circuit to Packet (CTP)150, 2008, 2024, and 2056 with Software Release CTPOS 6.2r1

References: (a) DOD Directive 4630.05, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 2004
(b) CJCSI 6212.01E, "Interoperability and Supportability of Information Technology and National Security Systems," 15 December 2008
(c) through (f), see Enclosure 1

1. References (a) and (b) establish the Defense Information Systems Agency (DISA), Joint Interoperability Test Command (JITC), as the responsible organization for interoperability test certification.

2. The Juniper CTP150, 2024, and 2056 with Software Release CTPOS 6.2r1 are hereinafter referred to as the System Under Test (SUT). The SUT met all of the critical interoperability requirements and is certified as interoperable for joint use within the Defense Information System Network (DISN) as a Fixed Network Element (F-NE). The SUT is deployed as a mated pair, and both SUTs must be loaded with the same certified Software Release CTPOS 6.2r1 in order to interoperate correctly. The SUT has three certified types of encapsulation which are CTP, Structured-Agnostic Time Division Multiplexing (TDM) over Internet Protocol (IP) (SAToP), and Circuit Emulation Services over a Packet Switched Network (CESoPSN). There is a fourth encapsulation only on the CTP 2000 series Network Elements called Voice Compression (VCOMP); however, this encapsulation type failed to meet the critical interoperability requirements with Software Release CTPOS 6.2r1 and is therefore, not certified for joint use within the DISN. The CTP2008 employs the same software and hardware as the CTP2024 with the exception of the number of available slots and scalability. JITC analysis determined that the CTP2008 is functionally identical to the CTP2024 for interoperability certification purposes and therefore, it is also certified for joint use within the DISN. The SUT met all the critical interoperability requirements as set forth in Reference (c), using test procedures derived from Reference (d). No other configurations, features, or functions, except those cited within this report, are certified by the JITC. This certification expires upon changes that affect interoperability, but no later than three years from the date of the Unified Capabilities (UC) Approved Products List (APL) memorandum.

JITC, Memo, JTE, Special Interoperability Test Certification of the Juniper Circuit to Packet (CTP)150, 2008, 2024, and 2056 with Software Release CTPOS 6.2r1

3. This finding is based on interoperability testing, DISA adjudication of open test discrepancy reports, review of the vendor's Letters of Compliance (LoC), and DISA CA accreditation. Interoperability testing was conducted by JITC at the Global Information Grid Network Test Facility, Fort Huachuca, Arizona, from 3 through 28 October 2011. DISA adjudication of outstanding test discrepancy reports was completed on 10 January 2012. Review of the vendor's LoC was completed on 10 January 2012. The DISA CA provided a positive recommendation on 11 April 2012 based on the security testing completed by DISA-led IA test teams and published in separate reports, References (e) and (f). The Certification Testing Summary (Enclosure 2) documents the test results and describes the test network.

4. The overall interoperability status of the SUT is indicated in Table 1. The interfaces and associated Capability Requirements (CRs) and Feature Requirements (FRs) critical used to evaluate the interoperability status are listed in Table 2. The interoperability test status is based on the SUT's ability to meet:

  a.   DISN services for Network and Applications specified in reference (c).

  b.   The overall system interoperability performance derived from test procedures listed in reference (d).

Table 1. SUT Interoperability Test Summary

DISN Access Interfaces			
Interface & Signaling	**Critical**	**Status**	**Remarks**
T1 CAS (AMI/SF) DTMF, MFR1	No[1]	Certified	Met all CRs and FRs with the following minor exception: The SUT did not meet the required EMOS of 4.0 or better for VCOMP encapsulation.[2].
T1 CAS (B8ZS/ESF) DTMF, MFR1	No[1]	Certified	Met all CRs and FRs with the following minor exception: The SUT did not meet the required EMOS of 4.0 or better for VCOMP encapsulation.[2]
T1 PRI (ANSI T1.607/T1.619a)	No[1]	Certified	Met all CRs and FRs with the following minor exception: The SUT did not meet the required EMOS of 4.0 or better for VCOMP encapsulation.[2]
T1 SS7 (ANSI T1.619a)	No[1]	Certified	Met all CRs and FRs with the following minor exception: The SUT did not meet the required EMOS of 4.0 or better for VCOMP encapsulation.[2]
E1 CAS (HDB3) DTMF, MFR1, DP	No[1] (Europe only)	Certified	Met all CRs and FRs with the following minor exception: The SUT did not meet the required EMOS of 4.0 or better for VCOMP encapsulation.[2]
E1 ISDN PRI (ITU-T Q.955.3)	No[1] (Europe only)	Certified	Met all CRs and FRs with the following minor exception: The SUT did not meet the required EMOS of 4.0 or better for VCOMP encapsulation.[2]
E1 SS7 (ANSI T1.619a)	No[1] (Europe only)	Certified	Met all CRs and FRs with the following minor exception: The SUT did not meet the required EMOS of 4.0 or better for VCOMP encapsulation.[2]
FXS/FXO	No[1]	Not Certified	All Secure Calls using FXS/FXO failed to maintain a Secure Call Session. This interface requires VCOMP encapsulation, which is not certified.
4-Wire E&M	No[1]	Not Certified	This interface requires VCOMP encapsulation, which is not certified.
Serial (EIA-232, EIA-530)	No[1]	Certified	Met all CRs and FRs.

Table 1. SUT Interoperability Test Summary (continued)

DISN Transport Interfaces			
Transport Level	**Critical**	**Status**	**Remarks**
Ethernet (IEEE 802.3ab) 10/100/1000 BASE T	No[1]	Certified	Met all CRs and FRs[3].
Ethernet (IEEE 802.3u) 10/100BASE T	No[1]	Certified	Met all CRs and FRs.
Features And Capabilities			
Features And Capabilities	**Critical**	**Status**	**Remarks**
Synchronization	Yes	Certified	Met all CRs and FRs.
Network Management	Yes	Certified	Met all CRs and FRs.
Security	Yes	Certified	Met all CRs and FRs[4].

NOTES:
1. The UCR does not stipulate a minimum Access interface requirement for a F-NE.
2. The SUT MOS measurements for each encapsulation type were recorded as follows: SATOP – 4.09/4.11, CESoPSN – 4.11/4.10 and CTP –4.02/4.09. VCOMP encapsulation, which is a conditional requirement, was tested but did not meet the critical UCR requirements. Therefore, VCOMP encapsulation is not certified for use within the DISN. DISA adjudicated certifying the SUT without VCOMP encapsulation as minor.
3. This interface is only certified on the CTP2008 and CTP2056.
4. Information assurance testing is accomplished via DISA-led Information Assurance test teams and published in separate reports, References (e) and (f).

LEGEND:

802.3u	Standard for carrier sense multiple access with collision detection at 100 Mbps	EMOS	Enhanced Mean Opinion Score
AMI	Alternate Mark Inversion	ESF	Extended Super Frame
ANSI	American National Standards Institute	F-NE	Fixed Network Element
B8ZS	Bipolar Eight Zero Substitution	FR	Feature Requirements
BERT	Bit Error Ratio Test	FXS/FXO	Foreign Exchange Station/ Foreign Exchange Office
CAS	Channel Associated Signaling	HDB3	High Density Bipolar 3
CESoPSN	Circuit Emulation Services over a Packet Switched Network	IEEE	Institute of Electrical and Electronics Engineers
		ISDN	Integrated Services Digital Network
CR	Capability Requirements	ITU-T	International Telecommunication Union – Telecommunication Standardization Sector
CTP	Circuit to Packet		
DCE	Data Circuit-Terminating Equipment	kbps	kilobits per second
DISA	Defense Information Systems Agency	Mbps	Megabits per second
DISN	Defense Information System Network	MFR1	Multi-Frequency Recommendation 1
DP	Dial Pulse	MLPP	Multi-Level Precedence and Preemption
DSS1	Digital Subscriber Signaling 1	PRI	Primary Rate Interface
DTE	Data Terminal Equipment	Q.955.3	ISDN Signaling Standard for E1 MLPP
DTMF	Dual Tone Multi-Frequency	SATOP	Structured-Agnostic Time Division Multiplexing (TDM) over Internet Protocol (IP)
E1	European Basic Multiplex Rate (2.048 Mbps)		
E&M	Ear and Mouth	SF	Super Frame
E2E	End to End	SS7	Signaling System 7
EIA	Electronic Industries Alliance	SUT	System Under Test
EIA-232	Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices	T1	Digital Transmission Link Level 1 (1.544 Mbps)
		T1.607	ISDN – Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
		T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
EIA-530	Standard for 25-position interface for DTE and DCE employing serial binary data interchange	UCR	Unified Capabilities Requirements
		VCOMP	Voice Compression

Table 2. SUT Capability and Feature Interoperability Requirements

DISN Access Interfaces			
Interface	**Critical**	**Requirements Required or Conditional**	**References**
T1 CAS (AMI/SF) DTMF, MFR1 T1 CAS (B8ZS/ESF) DTMF, MFR1 T1 PRI (ANSI T1.607/T1.619a) T1 SS7 (ANSI T1.619a) E1 CAS (HDB3) DTMF, MFR1, DP E1 ISDN PRI (ITU-T Q.955.3) E1 SS7 (ANSI T1.619a)	No[1] No[1] No[1] No[1] No[1] No[1] No[1]	• DS1 Interface Characteristics (C) • DS1 Supervisory Channel Associated Signaling (C) • DS1 Clear Channel Capability (C) • DS1 Alarm and Restoral Requirements (C) • E1 Interface Characteristics (C) • E1 Supervisory Channel Associated Signaling (C) • E1 Clear Channel Capability (C) • E1 Alarm and Restoral Requirements (C) • MOS (R) • BERT (R) • Secure Transmission (Voice and Data) (R) • Modem (R) • Facsimile (R) • Call Control Signals (R) • Alarms (R) • Call Congestion Control (R) • Call Congestion for TDM Transport (C) • Voice Compression (C)	• UCR Section 5.9.2.3.4 • UCR Section 5.9.2.3.4 • UCR Section 5.9.2.3.4 • UCR Section 5.9.2.3.4 • UCR Section 5.9.2.3.5 • UCR Section 5.9.2.3.5 • UCR Section 5.9.2.3.5 • UCR Section 5.9.2.3.5 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1.1 • UCR Section 5.9.2.1.2 • UCR Section 5.9.2.1.2.1 • UCR Section 5.9.2.2
Serial (EIA-232, EIA-530)	No[1]	• MOS TIA/EIA-232, TIA-EIA-530 (R)	• UCR Section 5.9.2.3.2
DISN Transport Interfaces			
Interface	**Critical**	**Requirements Required or Conditional**	**References**
IP	No[2]	• MOS (R) • BERT (R) • Secure Transmission (Voice and Data) (R) • Modem (R) • Facsimile (R) • Call Control Signals (includes MLPP) (R) • Congestion Control (C) (IP interface only) • Voice Compression (C) • Alarms • Delay (R) • Jitter (R) • Packet Loss (R)	• UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1.2 • UCR Section 5.9.2.2 • UCR Section 5.9.3.5 • UCR Section 5.9.2.3.9 • UCR Section 5.9.2.3.9 • UCR Section 5.9.2.3.9
SUT Features And Capabilities			
Feature/Capability	**Critical**	**Requirements Required or Conditional**	**References**
Synchronization	Yes	• Timing (R)	• UCR Section 5.9.2.3.7

Network Management	Yes	• Management Option (R)
		  Local Management (Front Panel and/or External Console) (C)
		  ADIMSS (C)
		• Fault Management (C)
		• Loop Back Capability (C)
		• Operational Configuration Restoral (R)
			• UCR Section 5.9.2.4.1
			
			• UCR Section 5.9.2.4.2
			• UCR Section 5.9.2.4.3
			• UCR Section 5.9.2.4.4

Security	Yes	• STIGs and DoDI 8510.01 (DIACAP) (R)	• UCR Section 5.9.2.6

NOTES:
1   The UCR does not stipulate a minimum required DISN access interface.
2   The UCR does not stipulate a minimum required DISN transport interface.

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Table 2. SUT Capability and Feature Interoperability Requirements (continued)

LEGEND:	
ADIMSS	Advanced DSN Integrated Management Support System
AMI	Alternate Mark Inversion
ANSI	American National Standards Institute
B8ZS	Bipolar Eight Zero Substitution
BERT	Bit Error Rate Test
C	Conditional
CAS	Channel Associated Signaling
DCE	Data Circuit-terminating Equipment
DIACAP	Department of Defense Information Assurance Certification and Accreditation Process
DISN	Defense Information System Network
DoDI	Department of Defense Instruction
DP	Dial Pulse
DS1	Digital Signal Level 1
DSS1	Digital Subscriber Signaling 1
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi-Frequency
E1	European Basic Multiplex Rate (2.048 Mbps)
EIA	Electronic Industries Alliance
EIA-232	Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices
EIA-530	Standard for 25-position interface for DTE and DCE employing serial binary data interchange
ESF	Extended Super Frame
FXS/FXO	Foreign Exchange Station/ Foreign Exchange Office
HDB3	High Density Bipolar Three
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ITU-T	International Telecommunication Union – Telecommunication Standardization Sector
Mbps	Megabits per second
MFR1	Multi-Frequency Recommendation 1
MLPP	Multi-Level Precedence and Preemption
MOS	Mean Opinion Score
PRI	Primary Rate Interface
Q.955.3	ISDN Signaling Standard for E1 MLPP
R	Required
SF	Super Frame
SS7	Signaling System 7
STIGs	Security Technical Implementation Guides
SUT	System Under Test
T1	Digital Transmission Link Level 1 (1.544 Mbps)
T1.607	ISDN – Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
TDM	Time Division Multiplexing
UCR	Unified Capabilities Requirements

5. No detailed test report was developed in accordance with the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNet at https://stp.fhu.disa.mil. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at http://jit.fhu.disa.mil (NIPRNet). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at http://jitc.fhu.disa.mil/tssi. Due to the sensitivity of the information, the Information Assurance Accreditation Package (IAAP) that contains the approved configuration and deployment guide must be requested directly through government civilian or uniformed military personnel from the Unified Capabilities Certification Office (UCCO), e-mail: ucco@disa.mil.

JITC, Memo, JTE, Special Interoperability Test Certification of the Juniper Circuit to Packet (CTP)150, 2008, 2024, and 2056 with Software Release CTPOS 6.2r1

6. The JITC point of contact is Mr. Khoa Hoang, DSN 879-4376, commercial (520) 538-4376, FAX DSN 879-4347, or e-mail to khoa.hoang@disa.mil. The JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The tracking numbers for the SUT are 1112202 (CTP150) and 1112203 (CTP2008, CTP2024, CTP2056).

FOR THE COMMANDER:

2 Enclosures a/s   for RICHARD A. MEADOR
                                                   Chief
                                                   Battlespace Communications Portfolio

Distribution (electronic mail):
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U.S. Joint Forces Command, Net-Centric Integration, Communication, and Capabilities
    Division, J68
Defense Information Systems Agency, GS23

ADDITIONAL REFERENCES

(c)   Defense Information Systems Agency (DISA), "Department of Defense Unified Capabilities Requirements 2008, Change 2," 31 December 2010

(d)   Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP), Change 2," 2 October 2006

(e)   Joint Interoperability Test Command, "Information Assurance (IA) Assessment of Juniper Circuit to Packet (CTP) 150 Release (Rel.) Circuit to Packet Operating System (CTPOS) 6.2 r1 (Tracking Number 1112202)," Draft

(f)   Joint Interoperability Test Command, "Information Assurance (IA) Assessment of Juniper Circuit to Packet (CTP) 2000 Release (Rel.) Circuit to Packet Operating System (CTPOS) 6.2 r1 (Tracking Number 1112203)," Draft

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. Juniper Circuit to Packet (CTP) 150, 2024, and 2056 with Software Release CTPOS 6.2r1; hereinafter referred to as the System Under Test (SUT).

2. SPONSOR. United States Navy (USN) Navy Region CNRNW, N61.

3. SYSTEM POC. Mr. Robert Buchanan, CNRNW N61, 120 South Dewey Street, Building 864, Bremerton, WA 98314, E-mail: Robert.c.buchanan@navy.mil.

4. TESTER. Joint Interoperability Test Command (JITC), Fort Huachuca, Arizona.

5. SYSTEM UNDER TEST DESCRIPTION. The SUT is a Fixed Network Element (F-NE) that provides multiple Digital Transmission Link Level 1 (T1), European Basic Multiplex Rate (E1), and serial access interfaces over an Internet Protocol (IP) transport. The SUT supports T1/E1 Primary Rate Interface (PRI), Channel Associated Signaling (CAS), and Signaling System 7 (SS7) interfaces. The SUT supports serial Electronic Industries Alliance (EIA)-232 and EIA-530 interfaces with a data rate range of 50 kilobits per second (kbps) to 12.8 Megabits per second (Mbps). The CTP2008 employs the same software and hardware as the 2024 with the exception of the number of available slots and scalability. JITC analysis determined that the CTP2008 is functionally identical to the CTP2024 for interoperability certification purposes, and it is also certified for joint use with the DISN. Both the CTP2024 and 2056 support Foreign Exchange Station (FXS), Foreign Exchange Office (FXO) and four wire Ear and Mouth (E&M) signaling; however, these interfaces require Voice Compression (VCOMP) encapsulation and, since the VCOMP encapsulation is not certified, neither are the FXS, FXO, and E&M interfaces. The SUT has three certified types of encapsulation; Circuit to Packet (CTP), Structured-Agnostic Time Division Multiplexing (TDM) over Internet Protocol (IP) (SAToP), and Circuit Emulation Services over a Packet Switched Network (CESoPSN). There is a fourth encapsulation called VCOMP; this encapsulation type failed interoperability testing with Software Release CTPOS 6.2r1 and is; therefore, not certified by JITC.

(a) CTP2024. The CTP2024 platform is a rack-mountable chassis that can be configured with 8 to 24 T1 or E1 interfaces with options for EIA-232 or EIA-530 interfaces. The chassis includes the option for redundant power.

(b) CTP2056. The CTP2056 platform is a rack-mountable chassis that can be configured with 8 to 56 T1, E1, EIA-232, or EIA-530 interfaces. The chassis includes the option for redundant power.

(c) CTP150. The CTP150 platform is a 1-RU high, full-rack wide chassis designed for tabletop shelf or rack installation. The chassis includes support for four or eight T1, E1, EIA-232, or EIA-530 interfaces and a removable Type II Compact Flash card, but no hard drive.

(d) CTP2008. The CTP2008 Circuit to Packet Platform is a 1 RU rack mountable chassis that supports up to 8 circuit emulation interfaces. The interface modules are software configurable and are the same across the CTP2000 line.

(e) Juniper CTPView Network Management. The CTPView network management system provides network operators with the tools necessary to monitor network availability reports on IP network performance, provision voice bundles, and troubleshoot voice issues through a Graphical User Interface (GUI).

6. OPERATIONAL ARCHITECTURE. The Unified Capabilities Requirements (UCR) Defense Information System Network (DISN) operational architecture is depicted in Figure 2-1. The Juniper CTP150, 2008, 2024, and 2056 are point-to-point devices that are fielded in pairs, and both must be loaded with the same certified Software Release CTPOS 6.2r1 in order to interoperate correctly. The SUT pairs will be employed as a F-NE in the DISN backbone as depicted in Figure 2-1.
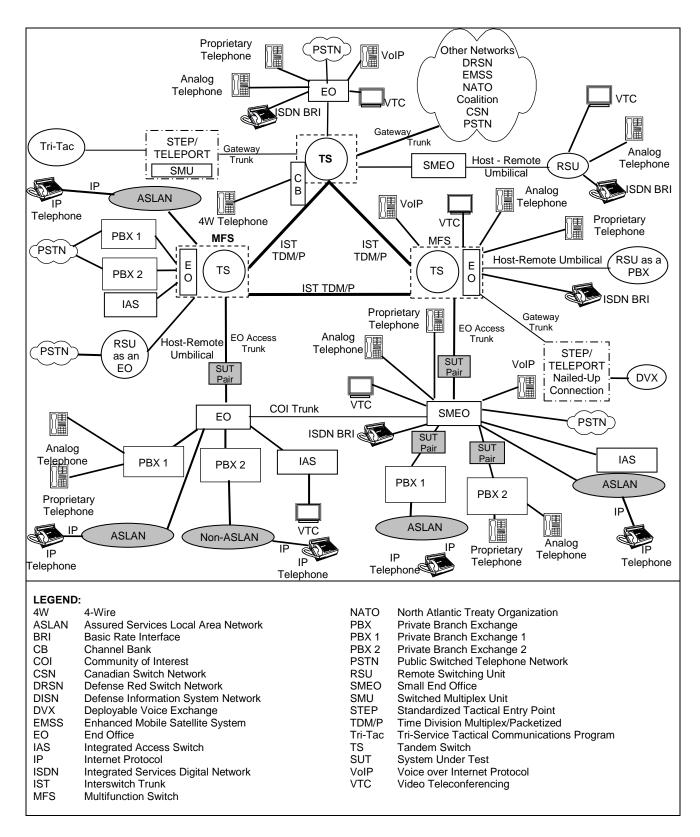
Figure 2-1. DISN Architecture

LEGEND:

4W	4-Wire		NATO	North Atlantic Treaty Organization
ASLAN	Assured Services Local Area Network		PBX	Private Branch Exchange
BRI	Basic Rate Interface		PBX 1	Private Branch Exchange 1
CB	Channel Bank		PBX 2	Private Branch Exchange 2
COI	Community of Interest		PSTN	Public Switched Telephone Network
CSN	Canadian Switch Network		RSU	Remote Switching Unit
DRSN	Defense Red Switch Network		SMEO	Small End Office
DISN	Defense Information System Network		SMU	Switched Multiplex Unit
DVX	Deployable Voice Exchange		STEP	Standardized Tactical Entry Point
EMSS	Enhanced Mobile Satellite System		TDM/P	Time Division Multiplex/Packetized
EO	End Office		Tri-Tac	Tri-Service Tactical Communications Program
IAS	Integrated Access Switch		TS	Tandem Switch
IP	Internet Protocol		SUT	System Under Test
ISDN	Integrated Services Digital Network		VoIP	Voice over Internet Protocol
IST	Interswitch Trunk		VTC	Video Teleconferencing
MFS	Multifunction Switch			

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7. REQUIRED SYSTEM INTERFACES. The SUT Interoperability Test Summary is shown in Table 2-1 and the Capability and Feature Requirements used to evaluate the interoperability of the SUT are indicated in Table 2-2. The SUT met some requirements through testing and submission of Letters of Compliance (LoC).

Table 2-1. SUT Interoperability Test Summary

DISN Access Interfaces			
Interface & Signaling	**Critical**	**Status**	**Remarks**
T1 CAS (AMI/SF) DTMF, MFR1	No[1]	Certified	Met all CRs and FRs with the following minor exception: The SUT did not meet the required EMOS of 4.0 or better for VCOMP encapsulation.[2]
T1 CAS (B8ZS/ESF) DTMF, MFR1	No[1]	Certified	Met all CRs and FRs with the following minor exception: The SUT did not meet the required EMOS of 4.0 or better for VCOMP encapsulation.[2]
T1 PRI (ANSI T1.607/T1.619a)	No[1]	Certified	Met all CRs and FRs with the following minor exception: The SUT did not meet the required EMOS of 4.0 or better for VCOMP encapsulation.[2]
T1 SS7 (ANSI T1.619a)	No[1]	Certified	Met all CRs and FRs with the following minor exception: The SUT did not meet the required EMOS of 4.0 or better for VCOMP encapsulation.[2]
E1 CAS (HDB3) DTMF, MFR1, DP	No[1] (Europe only)	Certified	Met all CRs and FRs with the following minor exception: The SUT did not meet the required EMOS of 4.0 or better for VCOMP encapsulation.[2]
E1 ISDN PRI (ITU-T Q.955.3)	No[1] (Europe only)	Certified	Met all CRs and FRs with the following minor exception: The SUT did not meet the required EMOS of 4.0 or better for VCOMP encapsulation.[2]
E1 SS7 (ANSI T1.619a)	No[1] (Europe only)	Certified	Met all CRs and FRs with the following minor exception: The SUT did not meet the required EMOS of 4.0 or better for VCOMP encapsulation.[2]
FXS/FXO	No[1]	Not Certified	All Secure Calls using FXS/FXO failed to maintain a Secure Call Session. This interface requires VCOMP encapsulation, which is not certified.
4-Wire E&M	No[1]	Not Certified	This interface requires VCOMP encapsulation, which is not certified.
Serial (EIA-232, EIA-530)	No[1]	Certified	Met all CRs and FRs.
DISN Transport Interfaces			
Transport Level	**Critical**	**Status**	**Remarks**
Ethernet (IEEE 802.3ab) 10/100/1000 BASE T	No[1]	Certified	Met all CRs and FRs[3].
Ethernet (IEEE 802.3u) 10/100BASE T	No[1]	Certified	Met all CRs and FRs.
Features And Capabilities			
Features And Capabilities	**Critical**	**Status**	**Remarks**
Synchronization	Yes	Certified	Met all CRs and FRs.
Network Management	Yes	Certified	Met all CRs and FRs.
Security	Yes	Certified	Met all CRs and FRs[4].

Table 2-1. SUT Interoperability Test Summary (continued)

NOTES:
1. The UCR does not stipulate a minimum Access interface requirement for a F-NE.
2. The SUT MOS measurements for each encapsulation type were recorded as follows: SATOP – 4.09/4.11, CESoPSN – 4.11/4.10 and CTP –4.02/4.09. VCOMP encapsulation, which is a conditional requirement, was tested but did not meet the critical UCR requirements. Therefore, VCOMP encapsulation is not certified for use within the DISN. DISA adjudicated certifying the SUT without VCOMP encapsulation as minor.
3. This interface is only certified on the CTP2008 and CTP2056.
4. Information assurance testing is accomplished via DISA-led Information Assurance test teams and published in separate reports, References (e) and (f).

LEGEND:

802.3u	Standard for carrier sense multiple access with collision detection at 100 Mbps	EMOS	Enhanced Mean Opinion Score
AMI	Alternate Mark Inversion	ESF	Extended Super Frame
ANSI	American National Standards Institute	F-NE	Fixed Network Element
B8ZS	Bipolar Eight Zero Substitution	FR	Feature Requirements
BERT	Bit Error Ratio Test	FXS/FXO	Foreign Exchange Station/ Foreign Exchange Office
CAS	Channel Associated Signaling	HDB3	High Density Bipolar 3
CESoPSN	Circuit Emulation Services over a Packet Switched Network	IEEE	Institute of Electrical and Electronics Engineers
CR	Capability Requirements	ISDN	Integrated Services Digital Network
CTP	Circuit to Packet	ITU-T	International Telecommunication Union – Telecommunication Standardization Sector
DCE	Data Circuit-Terminating Equipment	kbps	kilobits per second
DISA	Defense Information Systems Agency	Mbps	Megabits per second
DISN	Defense Information System Network	MFR1	Multi-Frequency Recommendation 1
DP	Dial Pulse	MLPP	Multi-Level Precedence and Preemption
DSS1	Digital Subscriber Signaling 1	PRI	Primary Rate Interface
DTE	Data Terminal Equipment	Q.955.3	ISDN Signaling Standard for E1 MLPP
DTMF	Dual Tone Multi-Frequency	SATOP	Structured-Agnostic Time Division Multiplexing (TDM) over Internet Protocol (IP)
E1	European Basic Multiplex Rate (2.048 Mbps)	SF	Super Frame
E&M	Ear and Mouth	SS7	Signaling System 7
E2E	End to End	SUT	System Under Test
EIA	Electronic Industries Alliance	T1	Digital Transmission Link Level 1 (1.544 Mbps)
EIA-232	Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices	T1.607	ISDN – Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
		T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
EIA-530	Standard for 25-position interface for DTE and DCE employing serial binary data interchange	UCR	Unified Capabilities Requirements
		VCOMP	Voice Compression

Table 2-2. SUT Capability and Feature Interoperability Requirements

DISN Access Interfaces			
Interface	**Critical**	**Requirements Required or Conditional**	**References**
T1 CAS (AMI/SF) DTMF, MFR1	No[1]	• DS1 Interface Characteristics (C) • DS1 Supervisory Channel Associated Signaling (C) • DS1 Clear Channel Capability (C) • DS1 Alarm and Restoral Requirements (C) • E1 Interface Characteristics (C) • E1 Supervisory Channel Associated Signaling (C) • E1 Clear Channel Capability (C) • E1 Alarm and Restoral Requirements (C) • MOS (R) • BERT (R) • Secure Transmission (Voice and Data) (R) • Modem (R) • Facsimile (R) • Call Control Signals (R) • Alarms (R) • Call Congestion Control (R) • Call Congestion for TDM Transport (C) • Voice Compression (C) • MOS EIA-232, EIA-530 (R)	• UCR Section 5.9.2.3.4 • UCR Section 5.9.2.3.4 • UCR Section 5.9.2.3.4 • UCR Section 5.9.2.3.4 • UCR Section 5.9.2.3.5 • UCR Section 5.9.2.3.5 • UCR Section 5.9.2.3.5 • UCR Section 5.9.2.3.5 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1.1 • UCR Section 5.9.2.1.2 • UCR Section 5.9.2.1.2.1 • UCR Section 5.9.2.2
T1 CAS (B8ZS/ESF) DTMF, MFR1	No[1]		
T1 PRI (ANSI T1.607/T1.619a)	No[1]		
T1 SS7 (ANSI T1.619a)	No[1]		
E1 CAS (HDB3) DTMF, MFR1, DP	No[1]		
E1 ISDN PRI (ITU-T Q.955.3)	No[1]		
E1 SS7 (ANSI T1.619a)	No[1]		
Serial (EIA-232, EIA-530)	No[1]	• MOS EIA-232, EIA-530	• UCR Section 5.9.2.3.2
DISN Transport Interfaces			
Interface	**Critical**	**Requirements Required or Conditional**	**References**
IP	No[2]	• MOS (R) • BERT (R) • Secure Transmission (Voice and Data) (R) • Modem (R) • Facsimile (R) • Call Control Signals (R) • Congestion Control (C) • Voice Compression (C) • Alarms • Delay (R) • Jitter (R) • Packet Loss (R)	• UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1 • UCR Section 5.9.2.1.2 • UCR Section 5.9.2.2 • UCR Section 5.9.3.5 • UCR Section 5.9.2.3.9 • UCR Section 5.9.2.3.9 • UCR Section 5.9.2.3.9
SUT Features And Capabilities			
Feature/Capability	**Critical**	**Requirements Required or Conditional**	**References**
Synchronization	Yes	• Timing (R)	• UCR Section 5.2.12.5.5.1.2.7

Network Management	Yes	• Management Option (R)
		  Local Management (Front Panel and/or External Console) (C)
		  ADIMSS (C)
		• Fault Management (C)
		• Loop Back Capability (C)
		• Operational Configuration Restoral (R)
			• UCR Section 5.2.12.5.5.2.1
			
			• UCR Section 5.2.12.5.5.2.2
			• UCR Section 5.2.12.5.5.2.3
			• UCR Section 5.2.12.5.5.2.4

Security	Yes	• STIGs and DoDI 8510.01 (DIACAP) (R)	• UCR Section 5.2.12.5.5.7

NOTES:
1 The UCR does not stipulate a minimum required DISN access interface.
2 The UCR does not stipulate a minimum required DISN transport interface.

Table 2-2. SUT Capability and Feature Interoperability Requirements (continued)

LEGEND:

ADIMSS	Advanced DSN Integrated Management Support System	ESF	Extended Super Frame
AMI	Alternate Mark Inversion	HDB3	High Density Bipolar Three
ANSI	American National Standards Institute	IP	Internet Protocol
B8ZS	Bipolar Eight Zero Substitution	ISDN	Integrated Services Digital Network
BERT	Bit Error Rate Test	ITU-T	International Telecommunication Union – Telecommunication Standardization Sector
C	Conditional		
CAS	Channel Associated Signaling	Mbps	Megabits per second
DIACAP	Department of Defense Information Assurance Certification and Acc3reditation Process	MFR1	Multi-Frequency Recommendation 1
		MLPP	Multi-Level Precedence and Preemption
DISN	Defense Information System Network	MOS	Mean Opinion Score
DoDI	Department of Defense Instruction	PRI	Primary Rate Interface
DP	Dial Pulse	Q.955.3	ISDN Signaling Standard for E1 MLPP
DS1	Digital Signal Level 1	R	Required
DSN	Defense Switched Network	SF	Super Frame
DSS1	Digital Subscriber Signaling 1	SS7	Signaling System 7
DTMF	Dual Tone Multi-Frequency	STIGs	Security Technical Implementation Guides
E1	European Basic Multiplex Rate (2.048 Mbps)	SUT	System Under Test
EIA	Electronic Industries Alliance	T1	Digital Transmission Link Level 1 (1.544 Mbps)
EIA-232	Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices	T1.607	ISDN – Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
		T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
EIA-530	Standard for 25-position interface for DTE and DCE employing serial binary data interchange	UCR	Unified Capabilities Requirements

8. TEST NETWORK DESCRIPTION. The SUT was tested at JITC's Global Information Grid Network Test Facility in a manner and configuration similar to that of the DISN operational environment. This test was conducted using the test configuration shown in Figure 2-2.
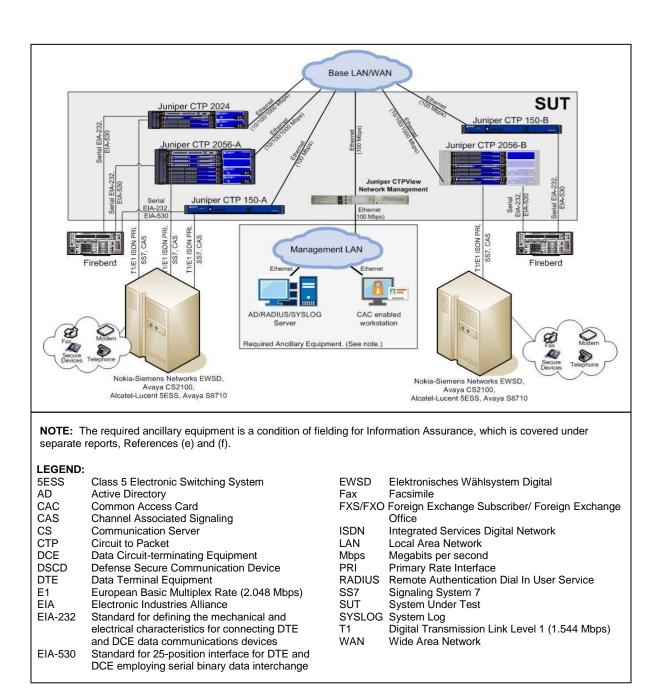
NOTE: The required ancillary equipment is a condition of fielding for Information Assurance, which is covered under separate reports, References (e) and (f).

LEGEND:

5ESS	Class 5 Electronic Switching System	EWSD	Elektronisches Wählsystem Digital
AD	Active Directory	Fax	Facsimile
CAC	Common Access Card	FXS/FXO	Foreign Exchange Subscriber/ Foreign Exchange Office
CAS	Channel Associated Signaling		
CS	Communication Server	ISDN	Integrated Services Digital Network
CTP	Circuit to Packet	LAN	Local Area Network
DCE	Data Circuit-terminating Equipment	Mbps	Megabits per second
DSCD	Defense Secure Communication Device	PRI	Primary Rate Interface
DTE	Data Terminal Equipment	RADIUS	Remote Authentication Dial In User Service
E1	European Basic Multiplex Rate (2.048 Mbps)	SS7	Signaling System 7
EIA	Electronic Industries Alliance	SUT	System Under Test
EIA-232	Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices	SYSLOG	System Log
		T1	Digital Transmission Link Level 1 (1.544 Mbps)
		WAN	Wide Area Network
EIA-530	Standard for 25-position interface for DTE and DCE employing serial binary data interchange		

Figure 2-2. SUT Test Network

9.   SYSTEM CONFIGURATIONS. Table 2-3 provides the system configurations, hardware, and software components tested with the SUT. The SUT was tested in an operationally realistic environment to determine interoperability with a complement of DISN switches noted in Table 2-3. Table 2-3 lists the DISN switches, which depict the tested configuration, and is not intended to identify the only switches that are certified with the SUT. The SUT is certified with switching systems listed on the Unified Capabilities (UC) Approved Products List (APL) that offer the same certified access interfaces as the SUT. The SUT is fielded in pairs and each pair must have the same Software Release CTPOS 6.2r1.

Table 2-3. Tested System Configurations

System Name	Software		
Avaya CS2100	SE 09.1		
Alcatel-Lucent 5ESS	5E16 BWM 09-0002		
Nokia-Siemens Networks EWSD	19d Patch Set 46		
Avaya S8710	CM 4.0 (R014X.00.2.731.7 Super Patch 14419)		
	Hardware	**Card Name**	**Software/ Firmware**
		Part Number/ Name	
SUT Juniper CTP2000 Rel. CTPOS 6.2r1	CTP2024	SERL-00006115	CTPOS v6.2r1
		PRC RTM-P018874/104	
		CLOCK RTM-CX0712	
	CTP150-A	SERL-ED9757	CTPOS v6.2r1
		T1/E1-ED9605	
	CTP2056-A	T1E1-00009837	CTPOS v6.2r1
		SERL-00005995	
		4WE&M-8460029	
		2WFXS-9110049	
		VCMP-13815	
		PRC RTM – P022058/103	
		1 Gig Fiber SC MM	
		CTP CLOCK MAIN-DW9562	
		CTP CLOCK SPOKE-DX0205	
		4WE&M RTM-08510027	
		2WFXS RTM – 09150016	
	Juniper CTPView Network Management	NA	CentOS v5.3
			CTPView v4.2r1
			MySQL v5.1.59
			Apache v2.2.19
	CTP2056-B	T1E1-00005214	CTPOS v6.2r1
		SERL-00006059	
		4WE&M-8460050	
		2WFXO-9110011	
		VCMP2-18283	
		PRC RTM – P22488/0291	
		1 Gig Fiber SFP	
		CTP CLOCK MAIN-DW9558	
		CTP CLOCK SPOKE-DX0196	
		4WE&M RTM-08510017	
		2WFXO RTM – 09100010	
	CTP150-B	SERL-ED9734	CTPOS v6.2r1
		T1/E1-ED9247	

LEGEND:

2WFXS	2-Wire Foreign Exchange Service		E1	European Basic Multiplex Rate (2.048 Mbps)
4WE&M	4-Wire Ear & Mouth		EWSD	Elektronisches Wählsystem Digital
5ESS	Class 5 Electronic Switching System		GIG	Gigabit
BWM	Broadcast Warning Message		Mbps	Megabits per second
CM	Communication Manager		SE	Succession Enterprise
CS	Communication Server		T1	Digital Transmission Link Level 1 (1.544 Mbps)
CTP	Circuit to Packet			

10. TESTING LIMITATIONS. None.

11. TEST RESULTS

a. Discussion

(1) DISN Access/Transport Interfaces. The SUT is certified with the following access interfaces: T1 CAS, T1 PRI, T1 SS7, E1 CAS, E1 ISDN PRI, E1 SS7, serial EIA-232, and serial EIA-530. The SUT is certified with an IP transport interface. The specific requirements and test results tested over all the SUT DISN access and transport interfaces with three encapsulation types (CTP, SAToP, and CESoPSN) are described in the subparagraphs below. The SUT offers a fourth type of encapsulation (VCOMP); however, this encapsulation type did not meet the critical capability and functional requirements with Software Release CTPOS 6.2r1 and is; therefore, not certified for joint use within the DISN.

(a) T1 Interface Characteristics. The UCR 2008, Change 2, paragraph 5.9.2.3, states that the T1 interface shall meet the requirements in accordance with UCR 2008, Change 2, paragraph 5.9.2.3.4. The Sunrise T10 test set was used to measure the SUT Digital Signal Level 1 (DS1) pulse mask to verify compliance to this requirement. The SUT met the International Telecommunication Union-Telecommunication Standardization Sector (ITU-T) G.711 and American National Standard Institute (ANSI) T.102 pulse mask characteristics which meets this requirement. The SUT T1 interface supports both Alternate Mark Inversion (AMI) and Bipolar Eight Zero Substitution (B8ZS) line coding as required in the UCR 2008, Change 2, paragraph 5.9.2.3.4 and; therefore, met this requirement.

(b) T1 Supervisory Channel Associated Signaling. The UCR 2008, Change 2, paragraph 5.9.2.3.4, states that the T1 supervisory channel associated signaling interface requirements. The SUT met this requirement by transporting, passing trunk seizure, answer supervision, dial pulse digits, preemption signals, and all other trunk supervisory information sent and received on a per channel basis was passed transparently through the SUT as required in the UCR 2008, Change 2, paragraph 5.9.2.3.4 and; therefore, met this requirement.

(c) T1 Clear Channel Capability. The UCR 2008, Change 2, paragraph 5.9.2.3 states that the T1 interface shall meet the clear channel capability requirements in accordance with UCR 2008, Change 2, paragraph 5.9.2.3.4. The SUT is capable of transmitting and receiving B8ZS line coding in accordance with UCR 2008, Change 2, paragraph 5.9.2.3.4 and, therefore, met this requirement.

(d) E1 Interface Characteristics. The UCR 2008, Change 2, paragraph 5.9.2.3, states that the E1 interface shall meet the requirements in accordance with UCR 2008, Change 2, paragraph 5.9.2.3.5. Furthermore, the E1 interface shall meet the requirements of ITU-T Recommendation G.703 and ITU-T Recommendation G.732. Voice signals in the PCM-30 framing format shall utilize the A-law encoding technique in accordance with ITU-T Recommendation G.772 (REV), "*Protected Monitoring Points on Digital Transmission Systems.*" The Sunrise E10 test set was used to measure the SUT

E1 pulse mask to verify compliance to this requirement. The SUT E1 interface characteristics in accordance with the UCR were met with both testing and vendors Letter of Compliance (LoC).

(e) Mean Opinion Score (MOS). The UCR 2008 Change 2, paragraph 5.9.2.1, states that the introduction of F-NEs shall not cause the end-to-end (E2E) average MOS to fall below 4.0 over any 5 minute time interval. The Sage 960B Multi-Channel Test Set was used to measure the Enhanced Mean Opinion Score (EMOS) based on the R factor E-model. The EMOS results for the SAToP Encapsulation was Near Far 4.11/Far Near 4.10. The EMOS results for the CESoPSN was Near Far 4.11/Far Near 4.10. The EMOS results for the CTP Encapsulation was Near Far 4.02/Far Near 4.09. The SUT met the EMOS requirement with the CTP, CESOPSN and SATOP Encapsulation protocols.

(f) Bit Error Rate Test (BERT). The UCR 2008, Change 2, paragraph 5.9.2.1, states that the introduction of an NE shall not exceed the E2E digital bit error rate requirement of less than 1 error in 1×10^9 bits (averaged over a 9 hour period). Testing was conducted on T1 and E1 interfaces as well as serial interfaces. The SUT T1 and E1 BERT results were measured at 1×10^{-10} and the serial at 64K BERT results were measured at 1×10^{-10} which met this requirement.

(g) Secure Transmission (Voice and Data). The UCR 2008, Change 2, paragraph 5.9.2.1, states that the introduction of NE(s) shall not degrade secure transmission for secure end devices as defined by UCR 2008, Change 2, Section 5.2.2. The UCR 2008, Change 2, Section 5.2.2, states that a DSCD device that supports one of the required signaling modes shall interoperate with and establish secure sessions with other compatible devices with at least an 85 percent secure call completion rate. There were 512 secure calls placed between Secure Terminal Equipment (STE) and Secure Wireline Terminal (SWT), STE to STE, and SWT to SWT. The SUT secure call test results are shown in Table 2-4. The SUT met the Secure Transmission requirement with the CTP, CESOPSN and SATOP Encapsulation protocols. The SUT had an 87 percent secure call completion rate, which met the requirement.

Table 2-4. SUT Secure Call Test Results

DISN Access Interfaces	DISN Transport Interfaces	Secure Call Matrix (32 calls placed per combination with a 87% completion rate)				
T1 CAS, E1 CAS, T1 ISDN PRI, E1 ISDN PRI, T1 SS7	IP with CTP, SAToP, and CESoPSN encapsulation	From \ To	STE (SCIP mode)	STE (STU mode)	STE (ISDN mode)	SWT
		STE (SCIP mode)	Completed	Completed	Completed	Completed
		STE (STU mode)	Completed	Completed	Completed	Completed
		STE (ISDN mode)	Completed	Completed	Completed	Completed
		SWT	Completed	Completed	Completed	Completed

Table 2-4. SUT Secure Call Test Results (continued)

(h) Modem. The UCR 2008, Change 2, paragraph 5.9.2.1 states that the F-NE(s) shall support a minimum modem transmission speed of 9.6 kbps across the associated pair of F-NE(s). There were 5,309 T1 modem calls placed through the SUT using the Abacus call loader. All modem calls had a transmission rate of 14.4 kbps, which met this requirement.

(i) Facsimile. The UCR 2008, Change 2, paragraph 5.9.2.1, states that the F-NE(s) shall support a minimum facsimile transmission speed of 9.6 kbps across the associated NE(s). There were 3,645 T1 facsimile calls placed through the SUT using the Abacus call loader. All facsimile calls had a transmission rate of 14.4 kbps, met this requirement.

(j) Call Control Signals. The UCR 2008, Change 2, paragraph 5.9.2.1, states that the F-NE shall transport all call control signals transparently on an E2E basis. This requirement was verified via testing and the vendor's LoC. The SUT transparently transported CAS supervision, and Common Channel Signaling protocol to include Multi-Level Precedence and Preemption (MLPP) call control signals, met this requirement.

(k) Delay. Delay occurs when packets take more time than expected to reach their destination. The UCR 2008, Change 2, paragraph 5.9.2.3.9, states that the addition of F-NEs shall not increase the one-way latency for each F-NE used, when measured from ingress to egress and averaged over any five-minute period more than that which is specified under the following conditions:

1. TDM Ingress G.711 (Non-secure calls) to Non-Transcoding ITU-T G.711 IP Egress shall not increase delay more than 50 milliseconds (ms) per NE pair as measured end-to-end. The SUT measured delay per NE pair increased the latency by 2.5 ms for all encapsulated types; which met this requirement.

2. TDM Ingress ITU-T G.711 (Non-secure calls) to Transcoding IP Egress with compression codec's (paragraph 5.9.2.1) shall not increase delay by more than 100 ms per NE pair as measured end-to-end. The SUT was not certified with any compression codecs; which is not required for a F-NE.

3. TDM Ingress ITU-T G.711 (Secure calls) to Non-Transcoding G.711 IP Egress shall not increase delay by more than 50 ms per NE pair as measured E2E. The SUT measured delay per NE pair increased the latency by 2.5 ms for all encapsulated types; which met this requirement.

4. TDM Ingress ITU-T G.711 (Secure calls) to Transcoding IP Egress with compression codec's (paragraph 5.9.2.1) shall not increase delay by more than 250 ms per NE pair as measured E2E. The SUT was not certified with any compression codecs; which is not required for a F-NE.

(l) Jitter (Transport IP Interface). The UCR 2008, Change 2, paragraph 5.9.2.3.9, states that the insertion of a NE shall not cause jitter measured from ingress to egress to increase by more than 5 ms averaged over any 5 minute period. The SUT jitter measurement averaged over a five-minute period was 0.002 ms, which met this requirement.

(m) Packet Loss (Transport IP Interface). The UCR 2008, Change 2 paragraph 5.9.2.3.9, states that the insertion of a NE shall not cause packet loss measured from ingress to egress to increase by more than 0.05 percent averaged over any 5 minute period. The packet loss for the SUT was measured at 0.00 percent for a five-minute period, which met this requirement.

(n) Differential Services Code Point (DSCP) Layer 3 Quality of Service (Transport IP Interface). The NE shall implement IP congestion control. Congestion may be controlled by using Differentiated Services which shall be capable of providing preferential treatment for call congestion over other media types in accordance with UCR 2008, Change 2, paragraph 5.3.3.3.2, and a capability to limit the provisioning of input and output interfaces such that congestion is impossible under the worst transport congestion scenario. The SUT sends the media and signaling sessions in the same packet stream and in accordance with the UCR, the sessions can be tagged with the same DSCP value. The SUT has the capability to set the DSCP tag for IPv4 and traffic class for IPv6 any value (0-63) on a port by port basis allowing the voice media and signaling to be set at one value (e.g. 46) and the serial ports for data traffic at another value (e.g. 0). This will allow the proper prioritization to protect voice and signaling media with a higher prioritization than data within the converged Local Area Network. The SUT met this requirement.

(o) Alarm and Restoral Requirements. The UCR 2008, Change 2, paragraph 5.9.3.5, states that the NE shall be able to propagate Carrier Group Alarms, in accordance with UCR 2008, Change 2, paragraph 5.9.2.1.1, upon physical loss of either the access or transport interfaces. This was verified by capturing the alarm status between the DISN switches and the SUT with the Sage 375A, Ultra-T1 and Ultra E1 test equipment. The SUT is capable of transparently passing the appropriate alarms, which met this requirement.

(p) Call Congestion. The UCR 2008, Change 2, paragraph 5.9.2.1.2, states that the NE shall assure that congestion between NEs does not impact DISN calls in progress or subsequent calls. Call congestion handling shall be met in one or more of the following three ways: dynamic load control signal; software capability which makes congestion impossible; or congestion is not possible in the SUT. Call congestion in the SUT is met because congestion is not possible due to the fact that TDM cannot saturate the transport link on the SUT.

(q) Voice Compression. The UCR 2008, Change 2, paragraph 5.9.2.2, states that the NE may include voice compression and if so must support at least one of the following standards:

• International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) Recommendation G.726, 32 kbps Adaptive Differential Pulse Code Modulation
• ITU-T Recommendation G.728, 16 kbps Low-Delay Code Excited Linear Prediction
• ITU-T Recommendation G.729, 9.6 kbps Conjugate-Structure Algebraic-Code-Excited Linear-Prediction

The SUT VCOMP encapsulation offers compression; however, this encapsulation is not certified. Therefore, the SUT is certified with clear mode ITU-T G.711 only.

(2) Device Management

(a) Management Option. The UCR 2008, Change 2, paragaraph 5.9.2.4, states that the NE devices must be managed by at least one of the following: The device may be managed locally by a front or back panel and/or external console control capability shall be provided for local management. The NE may be able to be centrally monitored and managed by the Advanced Defense Switched Network (DSN) Integrated Management Support System (ADMISS) in accordance with UCR 2008, Change 2, paragraph 5.9.2.4.1. The SUT is managed from a remote client, which can be used to monitor multiple units. The SUT is monitored by a management workstation. The workstation connects to the modules via Ethernet connection and uses Hypertext Transport Protocol Secure (HTTPS) via Transport Layer Security for secure encrypted session tunneling. Administrative tasks are performed via HTTPS web interface. The web interface allows an administrator to configure general settings, monitor operations, create or edit services, manage media processor units, and perform maintenance. The Juniper CTP is managed by a web browser (CTP view) or by Simple Network Management Protocol (SNMP) v3. Therefore, the SUT met this requirement.

(b) Fault Management. The UCR 2008, Change 2, paragraph 5.9.2.4.2, states that NEs may be capable of performing a self-test diagnostic function on non-active and active channels on a noninterference basis and report any failures to the assigned network management system. The SUT supports fault management using a secure management workstation which met this requirement.

(c) Loop Back Capability. The UCR 2008, Change 2, paragraph 5.9.2.4.3, states that NE shall provide loop back capability on each of the trunk side interfaces in accordance with ITU-T Recommendation V.54, "Loop Test Devices For Modems." This requirement was verified via testing and the vendor's LoC.

(d) Operational Configuration Restoral. The UCR 2008, Change 2, paragraph 5.9.2.4.4, states that loss of power should not remove configuration settings. The unit should be restored to the last customer configured state prior to the power loss, without intervention when power is restored. The SUT was placed into a power failure condition. The SUT returned to the last customer configured state prior to the power failure, which met this requirement.

(3) Security. The UCR 2008, Change 2, paragraph 5.9.2.6, states that the NE shall conform to the requirements outlined in Department of Defense Instruction (DoDI) 8510.01, "DoD Information Assurance Certification and Accreditation Process (DIACAP)". Security is tested as part of the Information Assurance testing and is covered under separate reports, References (e) and (f).

b. System Interoperability Results. The SUT met all the critical interoperable requirements for a F-NE as set forth in Reference (c) and is certified for joint use within the DISN. The SUT is deployed as a mated pair, and both SUTs must be loaded with the same certified Software Release CTPOS 6.2r1 in order to interoperate correctly. The SUT has three certified types of encapsulation which are CTP, SAToP, and CESoPSN. There is a fourth encapsulation called Voice Compression (VCOMP); however, this encapsulation type failed to meet the critical interoperability requirements and is; therefore, not certified for joint use within the DISN.

12. TEST AND ANALYSIS REPORT. No detailed test report was developed in accordance with the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNet at https://stp.fhu.disa.mil. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at http://jit.fhu.disa.mil (NIPRNet). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at http://jitc.fhu.disa.mil/tssi. Due to the sensitivity of the information, the Information Assurance Accreditation Package (IAAP) that contains the approved configuration and deployment guide must be requested directly through government civilian or uniformed military personnel from the Unified Capabilities Certification Office (UCCO), e-mail: ucco@disa.mil.